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ABSTRACT

Research questions and literature pertaining to a conceptual model on productivity at the departmental level are discussed. The model can be pictured as involving three goal-achievement processes: faculty research, faculty teaching, and student learning. Items that constitute the goal achievement process are goals, committed resources, expended resources, and outcomes. Interactions between these items are commitment, utilization, efficiency, and effectiveness. A distinction is made that concerns both perspective and process. Central issues and illustrative research are cited from the standpoints of "within process," "across perspectives," and "within perspective, across processes." (SW)

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DEPARTMENTAL PRODUCTIVITY:

AN ASSESSMENT OF CURRENT EFFORTS

May, 1978

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DEPARTMENTAL PRODUCTIVITY:
AN ASSESSMENT OF CURRENT EFFORTS

This is a second of a two-part sequence. The first paper, "Departmental Productivity: A Conceptual Model," develops and describes a paradigm for capturing the basic notions surrounding productivity, with particular emphasis on productivity at the departmental level. This second paper amplifies on the basic model by posing research questions evolving from the model and citing illustrative research work underlying each of the model's major components.

DEPARTMENTAL PRODUCTIVITY:
AN ASSESSMENT OF CURRENT EFFORTS

Introduction

The purpose of this paper is to further explicate a conceptual structure for studying departmental productivity presented in an earlier paper, "Departmental Productivity: A Conceptual Framework" (Romney, Gray, and Weldon, 1978). This explication largely consists of citing important or illustrative research work from the vantage point of the conceptual framework/model.

The model is perhaps best explained through illustration. Figure 1 displays a simplistic example of the model involving three goal-achievement processes: faculty research, faculty teaching, and student learning. The intent of this illustration is to "locate" pictorially certain notions pertinent to our proposed model. We view the academic department as a collection of processes (rather than a well-formulated set of anticipated outcomes, for example). A more complete understanding of the model and its interpretations at the departmental level requires several other formal notions.

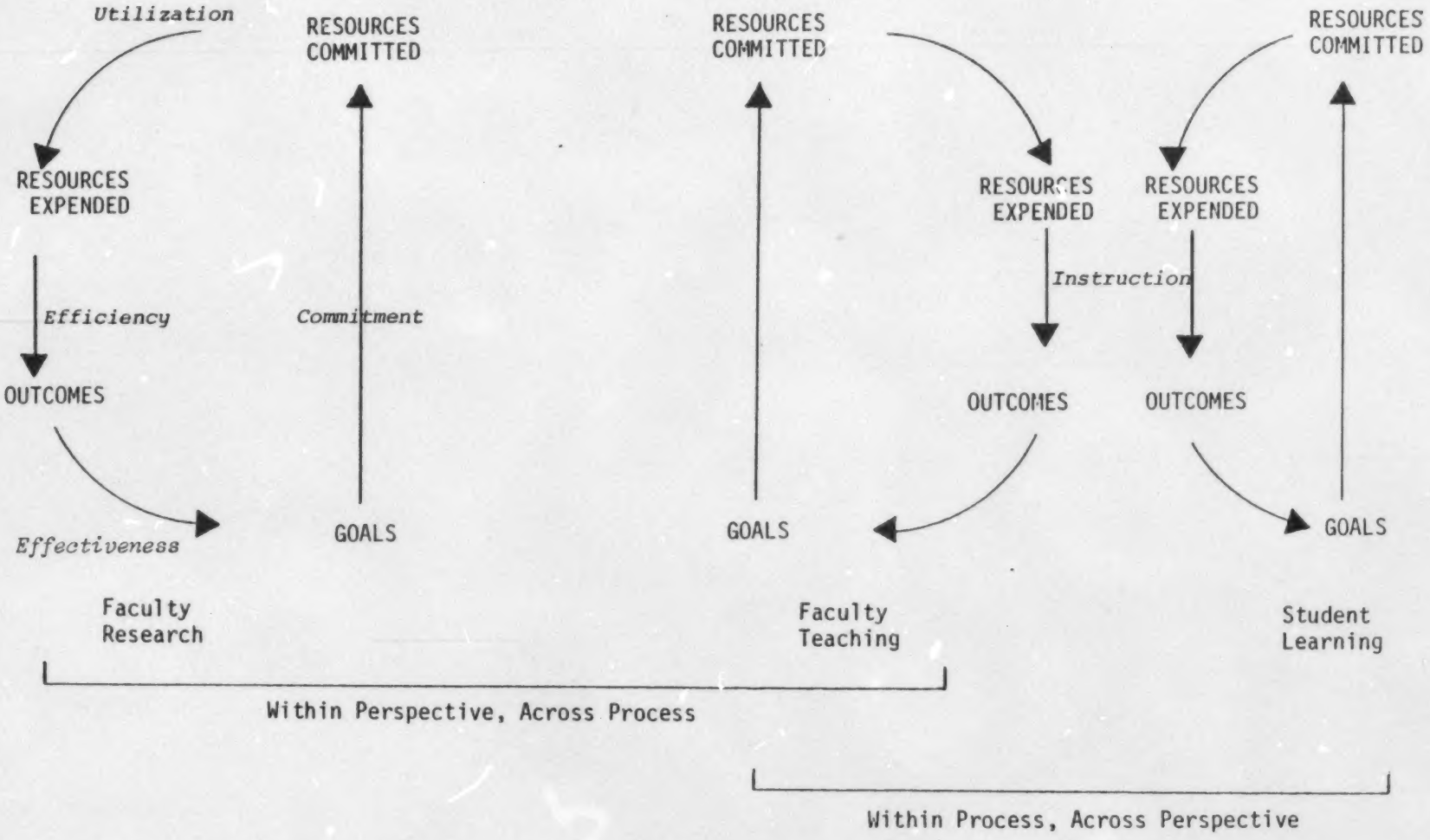
- Basic Building Blocks. These represent conceptual items that together constitute the goal achievement process. As such, they are prime targets for study. We have identified four such building blocks:

  1. Goals
  2. Committed Resources
  3. Expended Resources
  4. Outcomes

- Basic Productivity Linkages. These linkages are analytical constructs which reflect useful, observable, analyzable interactions between the basic building blocks. While there are a number of such constructs, we have identified four basic linkages:

FIGURE 1

A Departmental Perspective of the Goal Achievement Process:
The Intersection of Faculty and Student Perspectives



1. Commitment
2. Utilization
3. Efficiency
4. Effectiveness

- Processes. According to our model, the department is defined as a collection of processes, which immediately suggests that a more appropriate focus for studying departmental productivity is at the process level. Indeed, there are likely to be many subprocesses within each process, possibly occurring in a recursive or hierarchical fashion. We consider such activities as planning, counseling, teaching, learning, and research as examples of departmental processes.

- Perspective. We also envision each process as involving several mini-processes that are conducted for and on behalf of the relevant players or perspectives associated with the department. This notion is essential, we feel, to both illustrate and explain why so many departmental processes are, in fact, joint processes (i.e., the activities of one perspective or player become inextricably entwined with those of another player). This notion is also essential because most productivity measurements (certainly those which embody value judgments) are made by one or more of the players. This is inevitable, we feel, since it is the perspective/player which seeks to achieve goals, not the process per se. There are obviously many perspectives; the most important are undoubtedly students, faculty, departmental management, institutional management, funders, and colleagues in peer departments.

These components, illustrated in Figure 1 and discussed above, form the basis of our model of the departmental goal achievement process.

In further characterizing our model, we have chosen to focus on the components which are unique to this model: Basic Building Blocks and Basic Productivity Linkages. The remainder of this paper is organized so as to discuss each of the appropriate sub-components in turn. Because the various perspectives and processes

have been discussed at length in the literature, we omit specific inclusion of those discussions here. We have, however, defined a useful distinction which embraces both perspective and process and is helpful as an organizing vehicle for our discussion. We find that much of the relevant productivity literature tends to focus either on the activities/processes of individual perspectives, or on individual processes which, of course, require multiple perspectives. To capture these distinctions in the remainder of this paper we will use the sub-headings: within process, across perspective, or within perspective, across processes. (See Figure 1 for a simple illustration of this distinction.)

The following paragraphs discuss the Basic Building Blocks of departmental goal achievement processes: goals, committed resources, expended resources, and outcomes. In each case, we have tried to explicate the central issues and to cite illustrative research from both the within process, across perspectives standpoint and within perspective, across processes standpoint.

GOALS - IDENTIFICATION AND PRIORITIZATION

We view goals as the starting point of the goal-achievement process. Indeed, it is because individual perspectives hope to achieve certain goals and are seeking ways of leveraging their resources to accomplish these goals, that departmental processes are devised in the first place. Thus it appears that departmental goal-setting could be distilled to simply identifying goal preferences of individual perspectives and determining, "Whose goals are most important?" This, we feel, is a gross simplification. Consider that it only takes a few students with bad attitudes (viz., conflicting goals) to inhibit severely the productivity of an entire department. Similarly, a faculty member who pursues his own goals independently does so at the peril of the entire department. For these reasons, departmental goal identification and prioritization is an essential process and one which sets the foundation for measuring productivity.

Several fundamental research questions arise when one considers goal identification and prioritization.

- What are the stated goals of the various perspectives?
- How can goals of individual perspectives be characterized so as to help indicate when they have been accomplished?
- In an absolute and relative sense, how important are these goals to each of the various perspectives? How can goals be ordered or weights to reflect importance?
- Do the goals associated with individual perspectives change noticeably over time?
- How can similarities among the goals of individual perspectives be identified and quantified?
- How can activities/processes be identified which address certain goals held by multiple perspectives?

Within Process, Across Perspective. Considerable effort has been devoted to the analysis of interpersonal and organizational goals. Studies of the congruence of goals between groups have led to conclusions with respect to new measurement methodology (Danforth Foundation, 1969; Peterson, 1971a, 1971b, 1970, Romney, 1976, Uhl, 1971) and possible implications that may arise because of these differences (Romney, 1978; Smart, 1975; Smart and Elton, 1975). Discussions with respect to the differences between organizational goals as opposed to individual goals have also received attention (Gross and Grambsch, 1968; Conrad, 1974). Analytical methods capable of integrating the multiple goals of different perspectives have also recently received attention. The predominant methodologies have been variations of a DELPHI approach (Hendrick and Brown, 1972; Larreche, Hopkins, and Massy, 1977) or regression analysis (Kumar and David, 1974; Ford, Moskowitz, and Wittink, 1978).

Within Perspective, Across Processes. With few exceptions, goal identification for individual perspectives is seldom conducted as an end in itself but rather as a means of identifying the goals of a group (see above). There have been some discussions of identifying an individual's goals (Mager, 1972); however, the major activity in this area seems to focus around the topic Management-by-Objectives, Growth Contracting, etc. These are not goal-oriented per se, but do provide some assistance in helping faculty and students identify their goals at least with respect to the academic setting (Mullen, 1974). Just as individual goal identification is generally conducted in the context of identifying group goals, procedures for identifying and prioritizing individual goals are also used in developing prioritized statements of collective goals. One exception is an approach that uses regression analysis as the means of identifying an individual's multi-attribute utility function (Ford, Moskowitz, Wittink, 1978).

RESOURCES COMMITTED

We have previously stated a predisposition toward carefully distinguishing resources committed to various departmental processes from resources actually expended. This distinction is fundamental for several reasons. First, while it is true that commitment here represents a "planned" or "forecasted" expenditures, such "budgets" rarely are expended exactly as intended, and it is important to question why not. Second, this distinction is also the basis for discerning between "theoretical" behavior (i.e., to maximize preference or minimize loss) and "revealed" behavior wherein the nasty and capricious vagaries of departmental operations become manifest.

As a second guideline we propound a view of the department consisting of numerous activities or processes rather than a single monolithic process. This view requires resource commitment to individual processes by individual perspectives.

Thus, for example, we would tend to view general operating funds as a committed resource by the institution (acting as a perspective) toward various departmental processes. The sub-allocation of such funds might or might not be entrusted to the department management.

These notes suggest the key questions involved in studying resource commitment at the departmental level.

- What resources are available from individual perspectives?
- What incentives and constraints are placed by the departmental perspectives (or by external perspectives) on available resources?
- What players (perspectives) have made resource commitments, and toward what processes or outcomes?
- How important to the perspectives are their contributed resources?
- Are there important trends over time in the resources of commitment from particular perspectives or toward particular processes?

Within Processes, Across Perspective. This aspect of the departmental goal achievement process has never been investigated fully. From the standpoint of a PPBS, this activity should result in a sub-program budget. Customarily, only organizational dollars and staff time enter into such a budget; other resource commitments by students, parents, etc., are usually ignored. Hoenack and Norman (1974) reject the PPBS approach in favor of a decentralized market mechanism in the university to determine where resources should be committed. Fenker (1977) explores perceived faculty incentives and questions their role in resource allocation. Schmidtlein, Purves and Meisinger (1975) described the impacts of state-level actions on productivity, but many of the notions presented seem useful from a departmental viewpoint. Featherstone (1972) provides a departmental-level view of resource allocation and commitment.

Within Perspective, Across Processes. This area is best characterized by a variety of assignment studies. Miyataki and Byers (1976) described a procedure for matching individual faculty to specific activities or processes. While such a procedure may be more appropriately labeled "utilization" in our model, it is interesting to note how multiple perspectives become involved in committing the areas of resources of one perspective. This same commitment notion occurs again in the areas of Management-by-Objectives (Mullen, 1974) and Growth Contracting (Gordon College, 1976) where specific resources are allocated in anticipation of achieving specific objectives. Alden (1971) and Bogen (1978) have both pointed to the critical match (which is an a priori commitment) between students and faculty and their activities and expectations. Lorents (1971) has studied the expectations of future time commitments as voiced by individual faculty.

RESOURCES EXPENDED

We employ two important opinions in discussing the analysis of expenditures at the departmental level. First, according to our model, "departmental expenditures" is something of a misnomer. We mean, instead, the variety of expenditures on and toward departmental processes by the players (perspectives). Second, by "expenditures" we refer to the use of the whole range of available resources, not just dollars, needed to activate and complete the processes. As stated previously, we distinguish between resources committed and resources expended in order to capture not only the notion of resources at various points in time, but also to suggest that there may be unintended resources utilized and that de facto prioritizations may emerge.

Accordingly, the following important research questions are suggested:

- Who are the players in departmental processes and what are their contributions and involvements?

- Of what relative importance are these contributions to the players individually and collectively?
- Are there ways to "cost" the variety of resource contributions of players from other perspectives?
- Are there important trends in the actual usage of resources through time?

It is important to note that these questions form an essential backdrop and foundation for subsequent analytical investigations of utilization (the relationships between committed and expended resources) and efficiency (the relationships between outcomes and expended resources). In this sense, "expenditure analysis" is basic to the study of departmental productivity.

Within Process, Across Perspective. Little analytical effort is devoted to the full costing of departmental sub-processes. Indeed, this seems characteristic of educational processes at all levels. Some of the larger planning and resource allocation systems (e.g., CAMPUS, PLANTRAN, AND RRPM) are useful in capturing sub-departmental process cost, but these, of course, reflect only an institutional perspective of resources actually expended (see Gaunt and Haight, 1977, for a discussion and review of the fiscal availability of such large-scale computer packages).

Within Perspective, Across Processes. Perhaps the most clearly-documented example of studies in this area involve the actual distributions of faculty time. Manning and Romney (1973) and Romney and Manning (1973) describe procedures for capturing these costs and have examined the application of procedures in several departments. Other similar studies have sought to better measure faculty workload (see, for example, Jedamus, 1974; Blackburn, 1974), although these may better reflect resources committed than resources actually expended. More copious are the studies of

institutional dollar expenditures across activities (or more appropriately, across activity groups). NCHEMS' efforts at historical costing (e.g., Renkiewicz and Topping, 1973; Collier, 1975, and Gamso, 1977) are largely directed at the institutional perspective, yet effectively describe some departmental processes.

OUTCOMES

The outcomes dimension represents the culmination of one complete cycle of the goal-achievement process and embodies the efforts involved in accomplishing the goals that initiated the process. It is important to observe that just as unintended resources can be expended on a process, so also can intended outputs arise from a process. A second, and perhaps more important point is that the same outputs may address the goals of multiple perspectives; indeed, it may be impossible to separate or apportion outputs to individual perspectives. Outcomes, then, are at least partially process-dependent, as opposed to goals which are largely perspective-dependent.

The key research questions which surround outcomes assessment are:

- What are the specific outcomes arising from individual departmental processes?
- Can the process outcomes be apportioned to specific player/perspectives? (Note that this poses an interesting problem with respect to unintended outcomes.)
- In what ways are process outcomes valued by perspectives?
- Are important trends occurring in the production of outcomes from specific processes?
- How can often vague and elusive outcomes be identified and measured?

Within Process, Across Perspective. This is the more difficult aspect of outcomes measurement, since not only are individual processes characterized by widely-diverse outcomes, but the perspective role vis-a-vis these outcomes also must be identified. The identification and measurement aspects of this have recently received considerable attention. (See, for example, Enthovan, 1970; Bowen, 1974; Brown, 1970; Lenning, 1977a, 1977b, 1977c; Micek, Arney, 1974; Micek, Service, Lee, 1975; Micek, Wallhaus, 1973; Lenning, Lee, Micek, Service, 1977.) There are, however, extremely few efforts to assign particular outcomes to particular processes.

Within Perspective, Across Processes. This focus has received relatively greater attention, largely because of renewed interest in the student or faculty member as a whole person participating in multiple (including non-academic) processes. Student life, in particular, has received considerable attention (see, for example, Schalock, 1972; Bower and Renkiewicz, 1977; Astin, 1970).

The foregoing discussion has been concerned with what we call Basic Building Blocks for studying departmental productivity. We now turn to the related, but more complex, notions of Basic Productivity Linkages. Our model proposes four such linkages: commitment, resource utilization, efficiency, and effectiveness.

COMMITMENT

Once a perspective sets specific goals for itself, it must then determine how many resources will be devoted toward accomplishing each of the goals, the measure of which we have labeled "commitment." It is, in fact, a resource allocation decision and will obviously depend upon the level and nature of the resources that are available as well as the prioritization given to each goal. Thus the major issue involved at this point concerns the resource tradeoff decisions that must be made among the competing goals and processes.

We distinguish between resource allocation activities which are perspective-specific (i.e., resources must be allocated among valued goals of the perspective) and process-specific (i.e., what combinations of resources will best achieve the required outputs). The latter concept is typically considered an efficiency investigation (process-dependent), yet we are convinced that individual resource allocation decisions are influenced by the knowledge or expectations of efficiency. In a sense, we claim that each perspective envisions the efficiency of the production processes toward which resources are to be committed. This distinction is subtle, but useful in trying to understand perspective-based resource allocation.

Thus commitment studies address the following fundamental research questions:

- How can resources be allocated in a fashion which is consistent with the priorities of individual goals?
- What presumptions can or should be made about the commitment of resources by other perspectives to a particular process?
- What constraints exist on the resource allocation process itself (as opposed to constraints on goals or resources)?

Note that the questions above presume the existence of Basic Building Block information--in this case, the nature of goals and available resources.

Within Process, Across Perspective. As stated previously, this focuses largely on tinkering from individual perspective with a larger process so as to maximize output. It should be emphasized that this tinkering is still a planning (as opposed to production) linkage, and that the decisions made may reflect an imperfect understanding of the production process, as well as an uncertainty regarding the resource commitments of other perspectives. Typically, each player/perspective constructs a (formal or informal) model of the anticipated process, makes reasonable assumptions about uncontrollable factors, and then proceeds to exercise the model

under various combinations of controllable resources. There are few examples of this at the department level, but many studies exist at the institutional level. (See, for example, Wagner and Weathersby, 1971; Besel, 1972, Huckfeldt, Weathersby, and Kirschling, 1973; Dyer, 1973). While a significant number of efforts concentrate on studying the consequences of using controlled production processes, other researchers attack this area from more of a market perspective (Kumar, 1972; Hoenack, Meagher, Weiler and Yielgilt, 1974).

Within Perspective, Across Processes. Related research investigations deal almost exclusively with the issues of organizational rather than individual resource allocation. The analytical procedures that have been developed have focused on methods of conflict resolution and procedures designed to minimize the differences between desired and feasible levels of resource allocation. One of the more popular analytical approaches involves the use of a method called goal programming in which differences between desired and possible are minimized (Pilkanen, 1970; Wallhaus, 1971; Lee, Clayton, 1972; Schroeder, 1972). Other mathematically-based procedures allow the decision maker to specify tradeoff decisions until the results are acceptable (Geoffreon, Dyer, Feinberg, 1972), while other procedures have been suggested (by Trinkl, 1970, 1975, and Pfeffer & Salancik, 1974).

In the very specialized area of budget allocation, attempts have been made to routinize or standardize the distribution of dollars according to stated criteria (Boutwell, 1973; Kaludis, 1973; Simpson, 1975). Several large-scale efforts have been undertaken to model single-perspective views of the entire educational enterprise. Gaunt and Haight (1977), and Dresch (1974) discuss the merits of these efforts.

UTILIZATION

This aspect of the overall goal-achievement process is concerned primarily with assessing differences between resources committed or budgeted and resources expended. This audit function can be performed for a variety of reasons depending on who made up the budget and who expended the resources. It is interesting to note that this aspect of departmental productivity analysis is perhaps the most commonly-performed and the least-often documented.

Major research questions arising in this area are:

- What are the major differences between resources budgeted for and resources expended during a process?
- Are these differences attributable to specific perspectives?
- Are these differences explainable, and, if so, what are the causes?

Literature with a departmental focus in this area is scarce; apparently, such analyses are held to be of little public interest. One report published by the Carnegie Commission (1972) focuses on differences between faculty assignments and faculty activities, as does Lorents (1970) to some extent. At the national level, a variety of federal reports document the largely dollar-based differences between budgets and expenditures on major federal projects.

EFFICIENCY

This portion of the goal-achievement process is concerned with the conversion of resource inputs into outputs (outcomes). In our model, this is the only component which is predominantly process-dependent as opposed to perspective-dependent. The production process is, by definition, jointly held by the player/perspectives, and it is generally impossible to partition the activities of some participants from those of others.

Several major research questions arise in this context, largely centered around the measurement notion of efficiency.

- What production technology is used for this process, and what are the implications of this on resources and outputs?
- What measures can be established and validated to evaluate the "success" of the process?
- What objectives of the several perspectives were most valued (i.e., preserved) by the process and how were tradeoffs accomplished?

Within Process, Across Perspective. There is probably no other single aspect of the goal achievement process that has received more attention than assessing the efficiency of organizations or persons. The chief concern deals with determining the most appropriate ways to value inputs and outputs of education production processes (and in some cases, the technology) all of which have resulted in a number of different approaches being suggested. As examples, Becker (1964) and Attiyeh and Lumsden (1974) view education as developing human capital, whereas Witmer (1971), Eckaus (1973), Bottomley and Dunworth (1973, 1974) view educational success from the standpoint of economic returns. Many analytical methods have been advanced to measure the "success" of educational processes. One of the more straightforward methods involves calculating ratios of the valued outputs over valued inputs (Jablonsky, 1978). Others have suggested the need to capture the motivations behind the production behavior of the individuals involved in the production process (Brenneman, 1970; Kirschling and Staaf, 1975). Much concern has focused on the analysis of historical production behavior via the use of regression analysis (Levin, 1974; Brenneman, 1970; Astin, 1977, Hartnett and Centra, 1977). An alternative approach suggests that success be measured in relative terms (i.e., in relationship to other "best" performers within a sample of similar producers, see Carlson, 1972, 1975; Rodgers, 1976; and Gray, 1977).

Most of these analytical approaches are independent of the unit of analysis and are as useful at the departmental level as elsewhere.

Within Perspective, Across Processes. We have argued previously that this focus is relatively unimportant since production processes are rarely perspective-specific. It is interesting, however, that many of the measures related to "economic returns" of educational processes are, however, representative of the perspective-specific viewpoint (e.g., what can an average student expect to earn as a result of a post-secondary education experience?). We observe that while such measurements are computationally meaningful, they do little to characterize the "success" of the production process per se.

EFFECTIVENESS

The final analytical step in our model is that of assessing the coincidence of goals with outcomes held by particular perspectives. We refer to "effectiveness" as a measure or degree of this similarity, although this terminology may be somewhat pejorative. It is important to observe that each perspective perhaps may hold mutual goals for each departmental process or sub-process, and that these goals need not be the same. Where goals are the same across perspectives, we refer to this phenomenon as "congruence." It is also important to observe that since goals are largely held by perspectives (as opposed to process outcomes which tend to be jointly held), goal achievement (or effectiveness) becomes perspective (rather than process) dependent.

There are several basic analysis questions to be posed here.

- How can effectiveness be measured for each perspective?
- How important is effectiveness to each perspective, both absolutely and relatively?

- Does it make sense to speak of "process" effectiveness vis-a-vis "perspective" effectiveness?
- For individual perspectives, does a particular process have demonstrable effectiveness trends?

Within Process, Across Perspective. This set of investigations reduces to the question, "Are the players/perspectives in a process achieving the goals they held for it?" There is surprisingly little of this research at the departmental level. Romney (1976, 1978) has investigated a strategy for determining measures of progress or effectiveness toward institutional goals, many of which are applicable at the departmental level. Miyataki and Byers (1976) describe a procedure for associating departmental goals and outcomes, and emphasize (p. 76) the necessity of accomplishing this within various foci of analysis. Some current approaches toward organizational management, Program-Planning and Budgeting Systems (Peterson, 1971; Balderston and Weathersby, 1972) and Management-by-Objectives (Mullen, 1974), contract learning (Berte, 1975), or faculty Growth Contracting (Gross, 1976; Sanford, 1976) all have goal-achievement components, but there are few illustrations which actually embody effectiveness measurement.

Perhaps the most extensively but least carefully-measured aspect of "within process" effectiveness occurs in student ratings of faculty and/or courses (see, for example, Costin, Greenough, and Menges, 1971; Cohen, 1974; Zelby, 1974). Unfortunately, while a departmental process (i.e., instruction) is measured, the measurement is made by one perspective, and usually without capturing a priori instructor goals. The reciprocal measurement (grades) suffers the same problem: it is extremely difficult to capture a priori student expectations. The arrangement, however, is quite interesting since at least some measures of one perspectives success (e.g., faculty) are provided by another perspective (e.g., student) and vice versa.

Within Perspective, Across Processes. This set of investigations is typified by the question: "How successful is someone at accomplishing multiple objectives through multiple processes?" These analytical investigations are somewhat more tenuous than the former because it is usually necessary to capture information which extends beyond the normal purview of departmental operations. For faculty, as an example, the study becomes one of measuring satisfaction (e.g., Ladd and Lipset, 1975), but again it is extremely difficult to capture precisely the relationship between a priori goals and after-the-fact outcomes. A similar situation arises for students: student outcomes studies (e.g., Bower and Renkiewicz, 1977) invariably seek satisfaction measures--some of which are useful from a departmental standpoint--yet do not, in themselves, satisfy the effectiveness analysis step. In both cases, satisfaction is used as a subjective measure of similarity between goals and perspective-relevant outcomes.

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